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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,580	05/10/2001	Jiunn-Ren Hwang	NAUP0292USA	3189

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NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)
P.O. BOX 506
MERRIFIELD, VA 22116

EXAMINER

RUGGLES, JOHN S

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,580

Applicant(s)

HWANG ET AL.

Examiner

John Ruggles

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— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

The objection of Paper No. 4 to the abstract of the disclosure because it had more than 150 words is now withdrawn because a new amended abstract of acceptable length has been received in Paper No. 5. However, the amended abstract is still objected to since it has not been submitted on a separate sheet, as requested in the previous Office action (Paper No. 4).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 (as amended) is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The “cutting the plurality of lines of the first exposure regions” at page 8, line 32 to page 9, line 1 of the amendment (Paper No. 5) does not find basis in the original disclosure. It is also not clear whether the “cutting” of the first exposure regions with subsequent exposure regions involves double exposure (overexposure) or not. Therefore, this new phrase is considered new matter and is not enabled by the specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 (amended) is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claim 1 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in Paper No. 5, filed 30 January 2003. In that paper, applicant has stated at page 6, lines 30-31 that "no overexposure areas are formed due to twice exposure", and this statement indicates that the invention is different from what is defined in the claim(s) because the "cutting" of claim 1 reads on crossing or overlapping exposure areas (overexposure areas).

Claim Rejections - 35 USC § 102

The previous 35 U.S.C. 102(b) rejection of claim 3 as being anticipated by Ueno (Japanese Patent Publication 01-107527) of Paper No. 4 is now removed because claim 3 has been cancelled.

Claim Rejections - 35 USC § 103

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno (Japanese Patent Publication 01-107527) in view of Adair (US Patent 6,184,151).

Ueno teaches a method of preventing two-dimensional (optical proximity) effects caused by light diffraction during a photolithography process to form (define) a rectangular (array) pattern. A negative photosensitive resin (photoresist) is formed on a semiconductor substrate. The photoresist is exposed through a first linear mask pattern, 100 (having parallel lines, 101), shown in Figure 1(a). Then the photoresist is exposed through a second linear mask pattern, 200

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(having parallel lines, 201), shown in Figure 1(b) and positioned in perpendicular relation to the first exposure pattern to form an array of rectangular unexposed photoresist regions, 400, shown in Figure 2(a).

Ueno does not specify subsequent etching of the substrate using the remaining photoresist pattern as an etching mask and does not specify the formation of storage nodes for a dynamic random access memory (DRAM). Ueno also does not specify that the optical proximity effects to be avoided were corner rounding and pattern shortening.

Adair states that in order to scale down DRAM devices while maintaining sufficient capacitance, corner rounding and shortening effects should be avoided when forming the storage nodes (capacitors) in column 1, at lines 46-53. Adair also teaches plural perpendicular exposures (using masks having parallel linear patterns) of one or more photoresist layers to obtain sharp-edged corners (without significant corner rounding or image shortening) in the resulting photoresist image, followed by etching of an underlying substrate through the remaining photoresist pattern as an etching mask in column 6, at lines 6-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the Ueno double exposure method to form a rectangular array of unexposed photoresist portions with the DRAM storage node formation by subsequent etching taught by Adair. The expected result of this combination would be to avoid corner rounding and image shortening during DRAM storage node formation.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 6,492,073) in view of Adair.

Lin teaches a process of microlithography (photolithography) to avoid line end shortening caused by optical proximity effects. Column 6, lines 51-65 describes first exposure of a photoresist through transparent parallel line segments 600 of a first photomask shown in Figure 18A to form corresponding latent image line segments in the photoresist, then second exposure of end portions of the image line segments in the photoresist with a cutting mask having cutting elements 610 shown in Figure 18B. Lin also states that the order of these exposure steps can be reversed and that these masks and steps can be used equally well for forming images in either positive or negative resists. It should be clear that such cutting of the line segments would also remove other defects at the line ends, such as corner rounding.

Lin does not specify subsequent etching of the substrate using the remaining photoresist pattern as an etching mask and does not specify the formation of storage nodes for a dynamic random access memory (DRAM).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the Lin photolithography method involving a first exposure and second cutting exposure to form a rectangular array of unexposed photoresist portions with the DRAM storage node formation by subsequent etching taught by Adair. The expected result of this combination would be to avoid corner rounding and image shortening during DRAM storage node formation.

The previous 35 U.S.C. 103(a) rejections of claims 4-6 as being unpatentable over Ueno as applied to claim 3, and further in view of Adair in Paper No. 4 are now removed because claims 4-6 have been cancelled.

Response to Arguments

Applicant's arguments filed 30 January 2003 have been fully considered but they are not deemed persuasive. Applicant argues that the process involves first exposure of first exposure regions, then second cutting exposure of second exposure regions without overexposure of the cut regions due to double exposure. Amended claim 1 fails to particularly point out dual exposures without overlap. In fact, use of the term "cutting" introduces new matter not supported in the original specification. The use of this term "cutting" is also vague and indefinite with respect to the question of whether overlapping exposures (overexposures) should reasonably be interpreted as encompassed by this claim language.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., no overexposures) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP§ 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

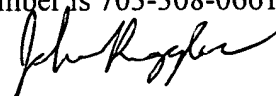
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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 703-305-7035. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



John Ruggles
Examiner
Art Unit 1756



KATHLEEN DUDA
PRIMARY EXAMINER